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SUGHRUE, MION, ZINN, MACPEAK & SEAS
2100 Pennsylvania Avenue, N.W.
Washington, DC 20037-3202

EXAMINER	
UHLIR, NIKOLAS J	

ART UNIT	PAPER NUMBER
1773	

DATE MAILED: 10/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/627,805	NAGAO ET AL.
	Examiner	Art Unit
	Nikolas J. Uhlir	1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment/arguments dated 07/08/2004. Applicant's amendment and arguments have been fully considered but are not persuasive. Currently, claims 1-32 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 19 requires the master carrier used in the transfer method of claim 1 to be produced at a substrate temperature of 25^{0}C and a pressure of 0.13-0.40 Pa. This language is unclear. The language of claim 19 requires the "entire" master medium to be formed at the specified temperature and pressure. However, the limitations in this claim would generally only be applicable to the formation of the magnetic layer on the surface of the substrate of the master medium. As is clear form the specification, only the metal magnetic layer is formed at these conditions. The substrate, which is provided separately, is presumably made under other conditions. Clarification is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2, 8, 19-21, 23, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Sawazaki (US4422106) as evidenced by Oda et al. (US5435903).

6. Claim 1 requires a transfer method for applying a magnetic field for transfer, comprising bringing a master carrier for magnetic transfer into close contact with a slave medium and applying a DC magnetic field whereby information is transferred, said master carrier comprising a magnetic layer deposited to correspond to the information to be transferred, said magnetic layer being formed on a surface of a substrate, and said slave medium being a magnetic recording medium to receive the transferred information, wherein relative magnetic permeability of the magnetic layer of the master carrier for magnetic transfers is within the range of 10-1000.

7. Regarding these limitations, Sawazaki teaches a method for contact magnetic transfer, wherein a master medium comprising a substrate having a magnetic layer formed thereon is brought into close contact with a slave magnetic medium, whereby the information from the master medium is transferred to the slave medium though the application of a DC magnetic field (see figures and column 6, line 58-column 7, line 14). The magnetic layer of the master medium is formed so as to have magnetic information recorded on it in a concave convex pattern (column 4, lines 15-25).

8. Regarding the relative permeability limitations of claim 1. Though Sawazaki does not expressly teach the required relative permeability, the examiner takes the position that this limitation is necessarily met by the reference. The examiner notes that relative permeability can be measured via application of a DC magnetic field or through the application of an AC magnetic field. However, the applicant has not defined in the specification or the claims how the relative permeability is measured. As evidenced by Oda, the relative permeability of a magnetic material when measured by an applied AC magnetic field is dependent on the frequency at which it is measured, with relative permeability decreasing as frequency increases (see figure 4 of Oda). DC relative permeability however, is known in the art to be frequency independent. Bearing this in mind, the examiner notes that it is his duty to give the claims their broadest reasonable interpretation. Thus, for the purpose of this examination, the examiner interprets "relative permeability" in the instant claims, to be mean relative permeability as measured by an AC magnetic field. This is consistent with the previous interpretation of this term in the prior office action.

9. Bearing the above interpretation in mind and the evidence provided by Oda, the examiner takes the position that "any" magnetic material will read on applicant's claimed relative permeability at "a" frequency. Thus, the relative permeability limitation is met.

10. Claim 2 is met as set forth above for claim 1.

11. Claim 8 requires the magnetic layer to be selected form the group consisting of Co, Fe, alloys of Co, and alloys of Fe. Sawazaki teaches that SmCo

(a Co alloy) and Ba Ferrite (an Iron alloy) are suitable materials for forming the magnetic layer (column 6, lines 60-65). Thus, this limitation is met.

12. Claim 19 requires the master carrier to be formed at a specific temperature and pressure. These limitations do not materially change the method of applying a transfer magnetic field required by claim 1 (upon which claim 19 is dependant). The method by which a master media is made has no impact on the method of applying a transfer magnetic field using that medium. Thus, as these limitations are not further limiting insofar as the method of applying a magnetic field or the structure of the magnetic master utilized in that method, they are met as met forth above for claim 1.

13. Claim 20 requires the master carrier to have a maximum reproduction intensity ratio of 1 and an error ratio of 0%. Though not expressly taught by Sawazaki, the examiner takes the position that this limitation is necessarily met by the reference, as Sawazaki teaches an identical method as that claimed by the applicant, and uses a master media having a structure that is substantially the same as that required by the instant claims.

14. Claim 21 is met as set forth above for claim 1.

15. Claim 23 is met as set forth above for claim 1.

16. Claim 26 is met as set forth above for claim 8.

17. Claims 1-9, 18-26 and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishida et al. (WO98/03972) as evidenced by Oda et al. (US5435903).

18. For the purpose of this examination, US6347016 has been utilized as an English Translation of the Ishida reference. All citations to Ishida are to the US reference. Further, the examiner notes that both the WO version and US version of Ishida, as well as the Oda reference were supplied with a prior office action.

19. The limitations of claim 1 are set forth above at section 6 of this office action.

20. Regarding these limitations, Ishida teaches a magnetic master medium comprising a substrate having an embossed pattern corresponding to an information signal, wherein magnetic material is deposited on the surface of at least the protruding portion of the magnetic material (see abstract). The examiner interprets the magnetic layer formed on the protruding portions of the substrate are equivalent to applicants claimed magnetic layer deposited to correspond to information that is to be transferred. Ishida further teaches bringing this master medium into close contact with a slave medium and applying a magnetic field to transfer information to the slave medium (column 13, lines 25-30 and figure 7). With respect to the applied magnetic field, Ishida discloses that a so-called "direct exciting field" and an "alternating and decaying bias magnetic field" are applied (column 14, lines 25-30). The examiner takes the position that the "direct exciting field" is in fact a DC magnetic field, whereas the alternating and decaying bias magnetic field is an AC magnetic field. Thus, Ishida teaches the application of both an AC and a DC magnetic field to effect the transfer of information from the master medium to the slave medium. Thus, Applicant's requirement of an applied DC magnetic field is met.

21. Regarding the relative permeability requirement. Though Ishida does not expressly teach the required relative permeability, the examiner takes the position that this limitation is necessarily met by the reference. The examiner notes that relative permeability can be measured via application of a DC magnetic field or through the application of an AC magnetic field. However, the applicant has not defined in the specification or the claims how the relative permeability is measured. As evidenced by Oda, the relative permeability of a magnetic material when measured by an applied AC magnetic field is dependent on the frequency at which it is measured, with relative permeability decreasing as frequency increases (see figure 4 of Oda). DC relative permeability however, is known in the art to be frequency independent. Bearing this in mind, the examiner notes that it is his duty to give the claims their broadest reasonable interpretation. Thus, for the purpose of this examination, the examiner interprets "relative permeability" in the instant claims, to be mean relative permeability as measured by an AC magnetic field. This is consistent with the previous interpretation of this term in the prior office action.

22. Bearing the above interpretation in mind and the evidence provided by Oda, the examiner takes the position that "any" magnetic material will read on applicant's claimed relative permeability at "a" frequency. Thus, Ishida meets the relative permeability limitation as set forth above.

23. Claim 2 is met as set forth above.

24. Regarding claims 3-4, Ishida teaches embodiments wherein soft magnetic materials having a coercivity of 60 kA/m are used (column 12, lines 52-62). Thus, the coercivity requirements of claims 3-4 are met.

25. Regarding claims 5-7. Ishida teaches that the saturation magnetization of the materials used for the master media magnetic layer should have a saturation magnetization of above 0.8 Tesla (column 21-33). Thus, Ishida anticipates the saturation magnetization requirements if claims 5-6. Further, Ishida teaches embodiments wherein soft magnetic materials having a coercivity of 60 kA/m are used (column 12, lines 52-62). Thus, Ishida anticipates the limitations of claim 7.

26. Regarding claims 8-9, Ishida teaches the use of Fe and Co alloys such as NiFe and FeCo as the material for the master media magnetic layer (column 13, lines 1-14). Thus, Ishida anticipates claims 8-9.

27. Ishida anticipates the limitations of claim 18 as set forth above.

28. Claim 19 requires the master carrier to be formed at a specific temperature and pressure. These limitations do not materially change the method of applying a transfer magnetic field required by claim 1 (upon which claim 19 is dependant). The method by which a master media is made has no impact on the method of applying a transfer magnetic field using that medium. Thus, as these limitations are not further limiting insofar as the method of applying a magnetic field or the structure of the magnetic master utilized in that method, they are met as met forth above for claim 1.

29. Claim 20 requires the master carrier to have a maximum reproduction intensity ratio of 1 and an error ratio of 0%. Though not expressly taught by

Ishida, the examiner takes the position that this limitation is necessarily met by the reference, as Ishida teaches an identical method as that claimed by the applicant, and uses a master media having a structure that is substantially the same as that required by the instant claims.

30. Claim 21 is met as set forth above for claim 1.

31. Claim 22 requires a step of applying an initial magnetic field to the slave medium to magnetize the magnetic recording medium in a direction opposite to the direction of said DC magnetic field prior to the step of applying the DC magnetic field. Ishida anticipates this limitation as disclosed at column 14, lines 31-35 and as shown in Figure 8.

32. Claim 23 is met as set forth above for claim 1.

33. Claim 24 is met as set forth above for claims 3-4

34. Claim 25 is met as set forth above for claims 5-7.

35. Claim 26 is met as set forth above for claims 8-9.

36. Claim 32 is met as set forth above for claim 18.

Claim Rejections - 35 USC § 103

37. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

38. Claims 1-9, 18-26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al. (WO98/03972) in view of Oda et al. (US5435903) and Sawazaki (US4422106).

39. Should it be determined that the Ishida reference "direct magnetic field" is not a DC magnetic field, the examiner maintains his position as set forth above at sections 17-36 of this office action, with the following modification.

40. Sawazaki teaches a contact magnetic transfer method that is similar to the method utilized by Ishida, in that a master medium is brought into close contact with a slave medium, whereby information from the master is transferred to the slave through the application of a magnetic field. Sawazaki expressly teaches that an AC magnetic fields or DC magnetic fields are suitable for use as the transfer magnetic field.

41. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a DC magnetic field as the transfer magnetic field in Ishida, as Sawazaki recognizes the equivalency of DC magnetic fields to AC magnetic fields as suitable magnetic fields for use as transfer magnetic fields in contact magnetic transfer processes.

42. Claims 10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as applied to claims 1 and 22 above, and further in view of Takahashi et al. (US5173370).

43. Ishida fails to disclose the particular FeCo alloy required by claims 10 and 27. However, Ishida does teach that FeCo is suitable for forming the magnetic layer of the master information carrier.

44. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize FeCo as the magnetic layer of the master information carrier taught by Ishida, as Ishida recognizes the equivalency of FeCo to the other materials listed as suitable.

45. Further, Takahashi teaches that the amount of Co in a FeCo magnetic film has a direct impact on the magnetic properties of the film, with coercivity and saturation magnetization decreasing below certain Co contents (~30 at% Co) (figure 12a). Thus, the examiner takes the position that the mount of Co in a FeCo alloy is a results effective variable.

46. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the amount of Co in the FeCo alloy of Ishida to a certain range so as to obtain a magnetic film having a desired combination of coercivity and saturation magnetization. Further it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the amount of Co in the FeCo alloy of Ishida to ~30 atomic % per the teachings of Takahashi, so as to obtain a film exhibiting peak coercivity and saturation magnetization.

47. Ishida as modified by Takahashi meet the limitations of claims 10 and 27 as set forth above.

48. Claims 10 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as modified by Sawazaki as applied to claims 1 and 22 above, and further in view of Takahashi et al. (US5173370).

49. The examiner maintains the rejection as set forth above at sections 42-47 of this office action in view of the rejection set forth at sections 38-41.

50. Claims 16-17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as applied to claims 1 and 22 above, and further in view of Nishimatsu et al. (US4701375).

51. Ishida as set forth above for claims 1 and 22 fails to teach the use of a slave medium having a synthetic resin film as a subtrate, as required by claims 16 and 31.

52. However, Nishimatsu teaches a magnetic recording medium having a polyethylene terephthalate substrate that is suitable for use on contact magnetic transfer processes (column 19, lines 8-30).

53. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the magnetic recording medium of Nishimatsu as the slave medium in the method taught by Ishida, as Nishimatsu specifically teaches that this recording medium is suitable for use in contact magnetic transfer processes.

54. Claims 16-17 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as modified by Sawazaki as applied to claims 1 and 22 above, and further in view of Nishimatsu et al. (US4701375).

55. The examiner maintains the rejection as set forth above at sections 50-53 of this office action in view of the rejection set forth at sections 38-41.

56. Claims 11-15 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as applied to claims 1 and 24 above, and further in view of Kitaori et al. (US5796533) and Dearnaley et al. (US5922415).

57. Ishida as set forth above fails to teach the use of a diamond like carbon (DLC) protective layer on the transfer information recording portion, where the DLC film has a hardness of 10 GPa, as required by claim 11.

58. However, Kitaori teaches a method for contact magnetic transfer employing a master medium comprising a substrate with a soft magnetic layer thereon (column 4, lines 3-21). Kitaori teaches that it is preferable to put a protective layer of DLC on the magnetic layer of the master medium, and to form a fluorine based lubricant on the surface of the DLC layer (column 4, lines 33-40).

59. Further, Dearnaley teaches a DLC film that enhances the adhesion of fluorine-based lubricants to its surface (column 2, lines 3-18). This DLC film is formed by an ion bombardment method that ruptures ~80% of the C-H bonds in the DLC film (column 3, lines 13-20). As a result, a DLC film having high hardness (10-20 GPa) is formed (column 3, lines 15-20). This film exhibits strongly improved adhesion to the metal layer (column 3, lines 25-34). Further the ruptured bonds in the DLC layer form ionic bonds with perfluoropolyether lubricants, thereby improving the adhesion of the perfluoropolyether to the surface of the DLC coating (column 2, lines 3-19; column 3, lines 35-50).

60. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to form a DLC coating and a lubricant layer as

taught by Kitaori over the surface of the magnetic layer of the master media taught by Ishida.

61. One would have been motivated to make this modification so as to improve the durability of the magnetic layer.

62. Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the DLC coating having a hardness of 10 GPa and the perfluoropolyether lubricant of Dearnaley for the DLC and lubricant coatings of Ishida as modified Kitaori, in view of the fact that the DLC coating of Dearnaley is taught to exhibit improved adhesion to metal magnetic layers and improved adhesion of lubricant layers.

63. The examiner acknowledges that Ishida teaches that increased spacing between the magnetic layer of the slave medium and the magnetic layer of the master medium can result in write spacing loss. However, one of ordinary skill in the art would still have been motivated to add the DLC layer and lubricant layers of Kitaori and Dearnaley so as to improve the durability of the master medium. More specifically, one of ordinary skill in the art would recognize the trade off between write field intensity and durability, and would be motivated to optimize the medium for either of these properties.

64. Regarding claims 12 and 15, wherein the applicant requires the DLC layer and lubricant layers to be a specified thickness. As noted above, the distance between the magnetic layer of the master medium and that of the slave medium has an impact on the intensity of the write field applied by the master to the slave. Magnetic fields are known to decrease in intensity as the distance from

their origin increases. Thus, the thickness of the DLC layer and the lubricant layer is a results effective variable.

65. Therefore it would have been obvious to one with ordinary skill in the art at the time the invention was made to control the thickness of the DLC layer and the lubricant layer utilized by Ishida as modified by Kitaori and Dearnaley so as to obtain a master medium having a desired balance between write field intensity and durability.

66. Claims 13 and 14 are met as set forth above for claim 11.

67. Claims 28-30 are met as set forth above for claims 11-15 and 22.

68. Claims 11-15 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida as modified by Sawazaki as applied to claims 1 and 24 above, and further in view of Kitaori et al. (US5796533) and Dearnaley et al. (US5922415).

69. The examiner maintains the rejection as set forth above at sections 56-67 of this office action in view of the rejection set forth at sections 38-41.

Response to Arguments

70. Applicant's arguments filed 07/08/2004 have been fully considered but they are not persuasive. Applicant's entire argument is that the claims as amended require the application of a "DC magnetic field," and thus obviate the examiners position regarding the frequency dependency of the relative permeability of magnetic materials. The examiner disagrees. While the instant claims do indeed require the application of a DC magnetic field during the magnetic transfer process, the mere application of this field does not indicate that

the relative permeability was measured with a DC magnetic field. The applicant in the claims requires the magnetic layer of the master to have "a" relative permeability of 10-1000. The claims do not specify how that relative permeability is measured. Further, the specification provides no guidance as to how the relative permeability is measured. Thus, the examiner finds applicants argument related to the frequency dependency of the relative permeability to be unpersuasive, as it is drawn to a limitation that is not required by the claims. Further, if applicants amend the claims to recite that the relative permeability is measured via a DC magnetic field, this limitation will be rejected as new matter because it has no support in the disclosure as originally filed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhlir whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nju

D. S. NAKARANI
PRIMARY EXAMINER